

Hurricane Katrina Disaster Site Worker Course

Lesson 9

Decontamination



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Overview

Disaster sites have the potential for being contaminated with many types of materials—chemical, biological, and radiological. Although the disaster site worker may be protected by the use of proper PPE at the disaster site, if adequate decontamination methods are not carried out before leaving the site, the contamination may be carried home and affect not only the worker but also his/her family and other friends and acquaintances in the community. This lesson will explore reasons for decontamination, discuss what types of items may require decontamination, describe various methods for the decontamination of personnel, and explain where decontamination will typically be done on a disaster site.

This lesson will take approximately **1.5 hours**.

Objectives

This topic will enable the participant to cite reasons for and methods of decontamination. Specifically, participants will be able to:

- Identify the reasons for decontamination
- Explain the importance of decontaminating at the worksite
- List types of decontamination (personnel, tools, heavy equipment, work areas)
- Explain where decontamination occurs in the contamination-zone scheme
- Describe methods of decontamination (personal hygiene and clothes washing, surface decontamination; staged decontamination)

Materials Needed for the Lesson

Trainer/Facilitator Requirements

Worker/Participant Requirements

<p>Flipchart and markers</p> <p>Videotape: <i>Working in the Hazard Zone: Decontamination (Decon)</i>. Safe Expectations. 17 minutes.</p> <p>or</p> <p>DVD: <i>The Decontamination Zone</i>. Summit Training Source, Inc. 12 minutes.</p> <p>Level C Doffing Demonstration (<i>optional</i>):</p> <ul style="list-style-type: none">Hard hatHalf face piece respirator with triple cartridgesSafety glassesTyvek CoverallCotton inner glove linersVinyl Inner glovesOuter chemical glovesWork glovesTyvek over booties	<p>Student Handouts:</p> <p>“Protect Your Family—Reduce Contamination at Home”, NIOSH Publication 97-125</p> <p>“Rescue and Recovery: Hygiene and Protective Practices for Workers”--OSHA-ABSA Alliance, September 2005</p> <p>“General Decontamination Card”, OSHA</p>
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Instructor Lesson Outline

- I. Lesson Objectives
 - A. Lesson objectives
 - B. Not covered: mass casualty decontamination
- II. Reasons for Decontamination
 - A. Definitions
 - 1. Contamination—toxic, hazardous, or infectious material that is
 - a. Deposited on skin or other parts of the body or on clothing (external contamination)
 - b. Deposited on tools or equipment or any other place in the environment (environmental decontamination)
 - c. Breathed in, swallowed, or absorbed through skin or through wounds (internal contamination)
 - 2. Decontamination—the process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing the hazardous chemical or other material
 - a. Physical removal methods—preferred
 - 1) Aeration
 - 2) Scraping, sweeping, brushing, or vacuuming
 - 3) Hosing
 - 4) Using absorbent material
 - 5) Using soap and water
 - b. Chemical removal methods
 - 1) Water—good
 - 2) Soap and water—better
 - 3) Bleach solution (sodium hypochlorite)--best
 - a) 0.5% (1:10 dilution) for personnel
 - b) 5% for objects
 - B. Potential sources of contamination at a disaster site
 - 1. Chemicals
 - a. Industrial (e.g., petroleum products)
 - b. Agricultural (e.g., pesticides)
 - c. Demolition products (e.g., asbestos, lead, silica)
 - 2. Biological agents

- a. Waterborne (e.g., E. coli, Salmonella, Shigella, Hepatitis A virus, agents of typhoid and paratyphoid, fungi)
 - b. Bloodborne (e.g, Hepatitis B virus, HIV)
 - c. Other (e.g., mold, fungi, tetanus)
- 3. Radioactive materials—NOT radiation itself but matter emitting radiation
- C. Decontamination protects
 - 1. Worker and co-workers
 - 2. Family and friends
 - 3. Community

III. Importance of Decontaminating on Site

- A. Contaminants travel home via
 - 1. Work clothing
 - 2. Skin, hair, and other body parts
 - 3. Tools and equipment
 - 4. Cars, pickups, and other vehicles
- B. Documented contaminants taken home include
 - 1. Asbestos
 - 2. Lead
 - 3. Mercury
 - 4. Cadmium
 - 5. Fibrous glass
 - 6. Infectious agents
 - 7. All of these and many others may be found at disaster sites

IV. Types of Decontamination

- A. Technical decon
 - 1. Not time constrained
 - 2. Also known as thorough, deliberate, detailed, responder, definitive
 - 3. Used for
 - a. Personnel
 - b. PPE

- c. Tools and equipment
 - d. Facilities
 - 4. Procedures and methods based on identified hazard(s)
 - 5. Allows for maximum protection of all personnel
 - 6. "Complete" decontamination of the residual hazard
 - B. Emergency decon
 - 1. Can occur at any point in a disaster response
 - 2. Considerations
 - a. Victim
 - 1) Type and severity of injury/illness
 - 2) Nature of contaminant(s)
 - b. Protection of decon and medical personnel
- V. Methods of Decontamination/Location of Decontamination
- A. Best method—minimize exposure!
 - B. Considerations for all methods
 - 1. Based on analysis of contaminant(s) present
 - 2. Part of safety plan (emergency response plan; site safety and health plan; or other)
 - 3. Evaluation of adequacy of decon
 - a. Visual
 - b. Chemical analysis of decon solution
 - c. Wipe sampling of deconned PPE and equipment
 - d. Radiation monitoring instrumentation
 - 4. Proper disposal of contaminated PPE, decon equipment, and solutions
 - C. Biological decontamination of surfaces contaminated with floodwater, blood or body fluids, feces, or other unknown material
 - 1. Add 1 part of Clorox or other bleach to 9 parts of water (e.g., about 1-3/4 cups bleach per gallon of water)
 - 2. Use a pressurized weed sprayer filled with the diluted bleach; use to decontaminate larger dry areas or even use on boots and gloves, or other impervious PPE, after use
 - 3. Allow a disinfectant to be in contact with the surface being decontaminated at least 3 minutes

4. Surfaces may also be decontaminated by wiping with the chemical decontaminant; in this case, no prolonged contact time is required because the act of wiping removes much of the contamination physically. Wipe heavily contaminated surfaces twice
 5. Remember to wear PPE to protect from the safety hazards of the chemical decontaminant
- D. Personal hygiene
1. On-site and other locations such as gas stations
 2. First line of defense for non-IDLH exposures
 3. Remove boots or shoes worn on worksites
 - 4.. Wash hands and face; shower (optional on-site; required off-site)
- E. Clothes washing
1. At home; laundromat; commercial laundry
 2. Important for all personal clothes contaminated with non-IDLH material
 3. Does not always succeed in removing contamination (e.g., lead, asbestos, pesticides)
 4. Wash work clothes separately from family laundry (washer should be run through a rinse cycle after laundering clothing)
- F. Staged Decon (most likely for decontamination for chemicals such as asbestos or pesticides)
1. On-site in “warm zone” = “decontamination zone” = CRZ: “contamination reduction zone”
 2. Can also be called a “decontamination corridor”
 3. Suitable for any kind of contaminant
 4. Site specific
 - a. Type of contamination
 - b. Type of work activities
 5. Procedure
 - a. “Decon line” consisting of as many stations as necessary to accomplish successful decontamination (up to 19 stations)
 - b. Each station emphasizes an important aspect of decontamination
 - c. Stations may be combined
 6. Minimum Decontamination Layout for Level C Protection

VI. Level C Doffing Demo (optional)

VII. Personal Theme Worksheet

Lesson Sequence

Lesson Objectives	<ul style="list-style-type: none"> Review lesson objectives State that decontamination of mass casualties will not be covered in this lesson
Reasons for Decontamination	<ul style="list-style-type: none"> Show sections from either the videotape or the DVD that illustrate the reasons for decontamination Directed discussion: <i>Ask students to</i> <i>Define contamination and decontamination</i> <i>Suggest sources of contamination at disaster sites</i> <i>Suggest reasons why it is important to decontaminate</i>
Importance of Decontaminating On-Site	<ul style="list-style-type: none"> Handout discussion: Review the routes of exposure on page 8 of NIOSH publication 97-125 Review pages 6-7 of NIOSH publication 97-125; <i>ask students to read aloud the descriptions of health effects for contaminants they think might be present at a disaster site</i>
Types of Decontamination	<ul style="list-style-type: none"> Define and explain considerations for Technical decon (personnel, tools, heavy equipment, facilities) Emergency decon (personnel)
Methods of Decontamination/ Location of Decontamination	<ul style="list-style-type: none"> Emphasize that the best method is minimizing exposure! Describe the following methods of decontamination and where they are likely to be accomplished: Personal hygiene and clothes washing Biological decontamination of surfaces Personal wet decontamination Staged decontamination
(Demonstration-- optional)	<ul style="list-style-type: none"> (Optional) Demonstrate Level C doffing procedure to minimize spread of contamination (<i>either the instructor</i>

	<i>demonstrates this himself or a student can volunteer to suit up in PPE and doff under instructor direction)</i>
Personal Theme Worksheet	<ul style="list-style-type: none"> Ask the students to record at least one thing discussed in this lesson that is their personal responsibility when working at a disaster site.

Tips for Worker/Participant Interaction

1. Give students 3 minutes to list (individually or in groups) what will be really important to them 20 years from now. Have the groups or selected individuals report back to the class. "Family" will be high on the lists. Use this result as a springboard to introduce the lecture on decontamination.
2. Ask the students to relate any experiences they have had with decontamination.
3. Use fluorescent invisible detection powder (e.g., Clue Spray™) to demonstrate how easy it is to spread contamination. Have a class volunteer handle an object that has been sprayed, then use a black light to detect the spread of the powder. Be sure to pick a volunteer who is wearing washable clothing, or have them suit up in Tyvek coveralls! Or have someone on the instructional staff be the "volunteer".
4. Set up a minimal decon line for Level C protection (see DHHS (NIOSH) Publication 85-115) and walk through it with the class.

References

1. Chapter 10. "Decontamination", Chapter 12. "Site Emergencies", and "Appendix D. Sample Decontamination Procedures for Three Typical Levels of Protection" in *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*. NIOSH/OSHA/USCG/EPA. DHHS (NIOSH) Publication 85-115.
2. *Emergency Response Guidebook* (latest edition). USDOT.
3. *Jane's Chem-Bio Handbook* (2nd edition). Jane's Information Group. Alexandria, VA 22314. info@janes.com.
4. *Decontamination for Hazardous Materials Emergencies* (1st edition). Timothy V. Henry. Delmar Learning. 1999. www.delmarlearning.com.
5. "Rescue and Recovery: Hygiene and Protective Practices for Workers"--OSHA-ABSA Alliance, September 2005

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Trainer Background Reference

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Selected Instructor Presentation Products

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**Worker/Participant
Handouts/Exercises/Demos/Worksheets**

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